Office Action Summary	Application No.	Applicant(s)
	10/798,650	LI ET AL.
	Examiner	Art Unit
	SEAN MOTSINGER	2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 July 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5,6,15-17,19,20,29-31,33 and 34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-3,5,6,15-17,19,20,29-31,33 and 34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)	
1) ☐ Notice of References Cited (PTO-892)	4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) ☐ Notice of Informal Patent Application
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.	6) ☐ Other: _____.

Response to Applicants Arguments/Amendments

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/28/2008 has been entered.

Applicant's arguments with respect to 35 U.S.C. 103 have been fully considered but are not persuasive. Applicant argues that the references do not disclose a step to "scale and prep" the projection thresholds prior to smoothing. The examiner disagrees this feature is disclosed in Hsieh as described in the rejection below.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 29-31 and 33-34 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. These claims claim a computer readable storage medium. This is broad enough to encompass both statutory subject matter such as a hard disk drive or non-statutory subject matter such as a transitory signal. Since signals are non-patentable the claim encompasses non-statutory subject

matter. The examiner suggests changing the claims to a non-transitory computer readable storage medium

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 5-6, 15, 19-20 and 29, 33-34 rejected under 35 U.S.C. 103(a) as being rendered obvious by Li et al US 6,449,330 in view of Hsieh et al US 6,529,575 in further view of Kachelriess et al Generalized multidimensional adaptive filtering for conventional and spiral single-slice, multi-slice and Cone-Beam CT. Med Phys. 28 (4) April 2001.

Re claim 1 Li discloses A method for reconstructing an image of an object, said method comprising: scanning an object using a computed tomographic (CT) imaging apparatus (column 3 lines 25-30) to acquire projections of the object; determining a set of scaled prepped projection thresholds (column 4 lines 5-10 note the thresholds are prepared and one is of greater scale and one of lesser scale the a previously known single

threshold method); associating selected smoothing kernels with said thresholds (column 4 lines 10-20); utilizing said smoothing kernels (column 4 lines 35-40) and said projections (column 4 lines 35-40) to produce three dimensional (See column 3 lines 35-40) smoothed projections (final projections column 4 lines 35-50) in accordance with said thresholds; and filtering and backprojecting the three dimensional smoothed projections (reconstructing column 4 lines 50-55) to generate an image of the object (column 4 lines 50-55).

Hsieh discloses determining, utilizing the projections, a set of thresholds see column 6 lines 1-15 and scaling and prepping the projections(see column 5 10-25 note the channel to channel gain is removed by the air calibration vector lines 45-60 note various corrections are made to the projections prior to filtering). The motivation to combine is "the ability to separate the real signal variations from the statistical fluctuation "If it is known prior to reconstruction that certain variations in the signal data is caused solely by statistical fluctuation, low-pass filters may be applied to the signal data without impacting the spatial resolution of the x-ray image. The key to differentiating between variations caused by the statistical fluctuations and the real signal variation or structure is the noise characteristic of the measured signal." Therefore it would have been obvious to use the adaptive threshold of Hsieh with the noise removal technique of Li to reach the afformentioned advantage.

Li further discloses a first threshold of the set of thresholds triggers smoothing (any one of thresholds one through 3 see lines 25-30)

Li does not disclose filtering in three dimensions and when the first threshold is not triggered smoothing in three dimensions is not performed. Kachelriess discloses filtering in three dimensions (page 478 section C 3d adaptive filtering) and when the first threshold is not triggered smoothing (below the threshold is does not trigger filtering page 478 section B) in three dimensions is not performed (page 478 section C 3d adaptive filtering). The references are combinable because they both deal with noise reduction of CT data. The motivation is to reduce noise while maintaining high resolution See abstract). Therefore it would have been obvious to combine Kachelriess with Li and Hsieh to reach the aforementioned advantage.

Re claim 5 Li discloses wherein said utilizing smoothing kernels and said projections to produce smoothed projections comprises utilizing a smoothing gain factor to modulate smoothing of said smoothed projections (column 4 lines 45-50).

Re claim 6 Li further discloses wherein said smoothing gain factor is a function of said projections (column 4 lines 45-50).

Re claim 15 ad 19-20 These claims, recite a ct scanner comprising a detector source and computer system for performing the method of claims 1, 5 and 6 respectively. Li discloses performing the method in a CT scanner as well see column 3 lines 25-40).

Re claim 29 and 33-34. These claims, recite a computer readable medium storing instructions for performing the method of claim 1, 5 and 6 respectively. Li discloses a computer readable medium see column 5 lines 15-20).

Claims 2-3,16-17, and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Hsieh and Kachelriess.

Re claim 2 Li further discloses wherein a smoothing kernel is associated with each threshold (column 4 lines 35-40). Li further discloses the set of thresholds contains more the one threshold and in one embodiment the set of thresholds includes three thresholds (column 4 lines 1-10); furthermore one of the smoothing kernals is associated with each threshold (column 4 lines 15-25). Li does not specifically recite that 4 thresholds could be used, however It is clear from the claim language of claim 1 and column 4 lines 1-10 that Li intents the set of thresholds to be discretionary and not necessarily limited 3 (i.e Li implies that other numbers of threshold greater then 1 may be implemented.) Therefore it would be obvious to one of ordinary skill in the art to try a number of thresholds not equal to 3 but greater then 1. The most obvious numbers to try would be 2 and 4 since they are closest to 3. Therefore it would have been obvious to one of ordinary skill in the art to implement Li with 4 thresholds.

Re claim 3 Li further discloses wherein a one-to-one correspondence exists between said smoothing kernels and said thresholds (column 4 lines 35-45).

Re claim 16 and 17 These claims, recite a ct scanner for performing the method of claims 2 and 3 respectively. Li discloses performing the method in a CT scanner as well see column 3 lines 25-30).

Re claim 30 and 31. These claims, recite a computer readable medium storing instructions for performing the method of claim 2 and 3 respectively. Li discloses a computer readable medium see column 5 lines 15-20).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SEAN MOTSINGER whose telephone number is (571)270-1237. The examiner can normally be reached on 9-5 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SEAN MOTSINGER/
Examiner, Art Unit 2624